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AUG 78 B P LIENTZ, M CHEN N00014-75-C-0266

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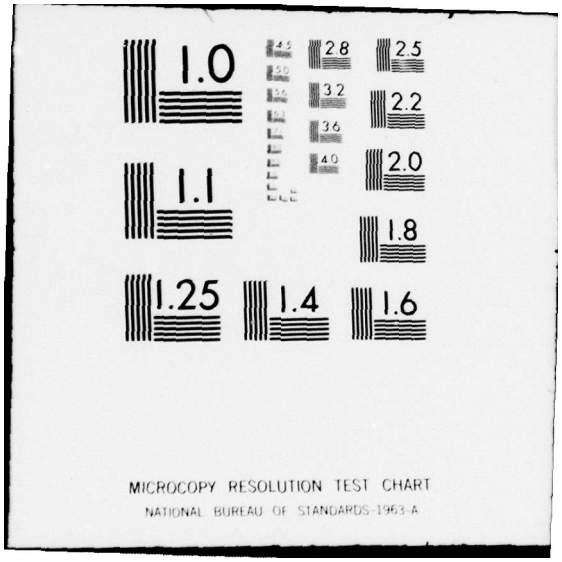
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

LEVEL

12 NW

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: Technical Report
2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle): Long Range Information Services Planning - A Methdology
5. TYPE OF REPORT & PERIOD COVERED: Technical rept.
6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s): Bennet P. Lientz, Myles Chen
8. CONTRACT OR GRANT NUMBER(s): N00014-75-C-0266

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Graduate School of Management
University of California
Los Angeles, CA 90024

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: NR049-345

11. CONTROLLING OFFICE NAME AND ADDRESS
Information Systems Program
Office of Naval Research, Arlington, Virginia

12. REPORT DATE: Aug 78
13. NUMBER OF PAGES: 22

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

15. SECURITY CLASS. (of this report): unclassified
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

distribution of this document is unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Information services
planning methodology
Strategic Information planning
action plans
maintenance

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

copy abstract

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-014-6601

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Long Range Information Services Planning - A Methodology *

Bennet P. Lientz** and Myles Chen

An integrated method for the long range planning of information services is presented. The problems associated with such planning are discussed along with requirements for such planning. The method consists of six stages beginning with understanding the current environment and ending with the evaluation criteria of projects. An intermediate level, strategic information services planning, is proposed to develop a project slate to be activated through an action plan. An approach to implementation is suggested. Two applications are discussed.

* This work was partially supported by the Information Systems Program, Office of Naval Research, Project No. NR 049-345, Contract No. N00014-75-C-0266.

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1. Information Services Planning

Information services has its roots in the development of computer based systems. With the wider involvement of users (Allen and Lientz, 1978) and the spread of distributed processing the scope of information systems concerns has expanded. Planning for computer based systems now involves:

* information systems - systems development and maintenance
* data processing
* word processing and office administration
* data administration - management and administration of data
* information systems oriented part of user organizations

Where these functions are found is dependent upon organization. The wider scope has the benefit of encompassing the future distribution of computer systems. But it also increases responsibility and problems in the application of a planning methodology. The tension between these factors forces a decision upon the start of planning activities -- the decision of scope. As we will see in several examples, it seems more evident that the planning effort should be applied across the wider range as opposed to greater depth in one or two areas. We will consider the benefits and responsibilities emanating from this approach.

Given the scope of information services ad defined above, we will

develop a long range information systems planning (LRISP) methodology. As we will see, the method is evolutionary from previous methods and yet stresses a more active role by management.

2. Failure

Not a pleasant title for a subsection. Yet this is what has happened to many planning efforts in information services. Looking at several articles and books (including McLean and Soden; 1977, Kelly,1977; Lucas, 1975; Nolan, 1974) we can formulate several problem areas:

* planners assume a participation, pro active role in planning
* narrowness in scope to data processing leads to emergency upgrading of facilities
* the LRISP is only a replication of multiple action plans
* LRISP lacks direction and end products

Evidence of failure includes heavy emphasis on annual planning and a reliance on planning in easier, more quantitative areas of information services. In some cases planning activities may only be activated to justify new resources -- to show to higher management that a plan exists. In applying the method are present, careful attention must be given to failure avoidance.

3. Business Planning and Long Range Information Systems Planning - Common Myths

A common myth is that the LRISP must be reflected in the organization's

long range business plan. Like a fleet of vehicles or a personnel department, information services is mainly reflected in the costs and resources consumed. In general then there is little active relation between LRISP and a long range business plan. Exceptions are industries which have information services as major products.

A second myth is that the LRISP can be developed like a long range business plan. But there are several major differences. First, the business plan is often based on economic data and standard financial methods. Consolidation and trade-off analysis are facilitated by the tools available and the existence of an analysis framework. Such tools do not easily encompass information services.

A second difference is based on the nature of information services. Information services consume resources. As such they incur costs which are identifiable. Note that this is more difficult as computer based systems become more embedded in the organization. Information services provide services to user organizations. The old method of valuing this service in terms of equivalent manual effort has lost some of its validity. Several factors behind this are the increased function of computer systems (e.g. - decision support systems - Keen, 1977) and the dependence on computer systems for administrative and managerial purposes. We are left with the problem of evaluating the services provided. This will be discussed later in more detail, but it remains a highly elusive target.

4. Why do long range information services planning

With the problems and failures cited above we can see that this question must be taken seriously. The first stage of the method presented here necessitates an effort to answer this question.

The requirements for an LRISP rests on measurement needs by management (see McLean and Soden, 1977) which include:

* Understanding growth and trends in information services
* Utilizing technology to reduce manual effort (e.g. - word processing replacing part of a secretarial staff)
* Controlling the costs and spread of computer based systems

Trends in information services support the need for planning. These include:

* Increase in performance/price of computers leads to the spread of small minicomputers without controls. This can lead to high expansion and integration costs later.
* Increase in cost of software. As Lientz et al (1978) indicate, maintenance costs are rising rapidly. Personnel costs rise without a corresponding increase in productivity.
* Increase in complexity due to the need for coordination and planning of distributed computing systems (Jackson, 1976).

These factors in turn increase the vulnerability and frustration in management. Technology improves and yet costs rise. To highlight this problem, one of the authors conducted several planning sessions where the assumption was almost zero hardware cost. Such sessions

are helpful in changing the focus away from data processing equipment.

Another assumption in such sessions is that organizations adopt new technology slowly unless it is a plug-in replacement, for an existing system. This is borne out in a study of software maintenance (Lientz et al, 1978) which indicates that computer based systems migrate across to new equipment but still maintain their old inefficiencies. Most of such systems do not fade away. They continue to be maintained at higher cost. Further evidence in the survey was the lack of use of productivity aids and data base management systems. This inertia points out the need for control as well as the need for directions for positive change.

5. Requirements for Long Range Information Services Planning

To develop a LRISP a method must be practical, structured, consistent and integrated. More specifically, it must:

* Avoid jargon since it must be understood by management and users
* Be clearly understood by those who participate as well as those in the audience
* Be formal and structured to support information flows between organizations
* Be consistent in uniformity of data collection
* Be integrated with annual action planning for information systems projects

Although these requirements apply to business planning, they are even more useful in information services because of the technology jargon,

technical complexity of the subject, and the number of organizations involved in information services.

Given the requirements we can turn to the setting of the long range planning activity.

6. Levels of planning

We distinguish three levels of planning. These are:

* Long range information services planning - produce strategy and action candidate projects
* Strategic information services planning - integrate the LRISP and action plans to obtain a slate of projects
* Action planning - develop detailed project plans for each project on the project slate

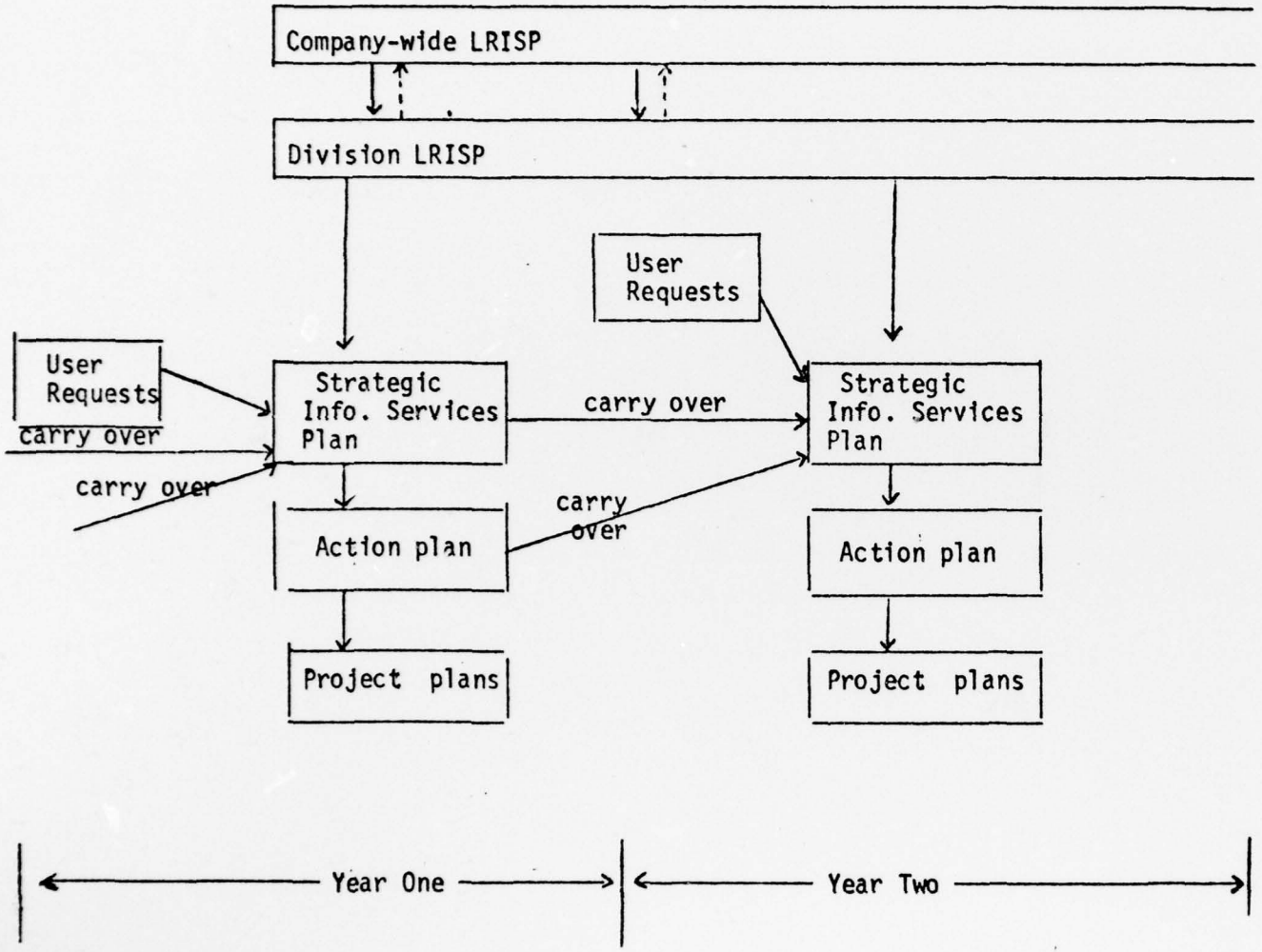
By themselves LRISP and action plans conflict in scope, schedule, and focus. Strategic information services planning provides the interface between LRIS planning and action planning. The differences between each of these is shown in Figure 1 and in Figure 2. The LRISP has as its main interest the increase in the effectiveness of information services. The focus is on the direction of future actions. By contrast, action planning responds to immediate urgent needs. The focus of action planning is on commitment.

Figure 1: Features of planning levels

Planning levels	Characteristics	Interest	Focus
LRIS Planning	proactive	effectiveness	direction
Strategic Info. Services planning	interactive	balance	control
Action planning	reactive	urgent needs	commitment

In the past the differences between these levels have been ambiguously defined. Attention has centered on the development of LRISP without the cement of strategic information services planning. We will return to these levels later when discussing implementation. To summarize the levels figure 2 is included to show the interface between the levels of planning at two organization levels - division and company-wide.

Figure 2: Interface between Information Services Planning Activities



7. Method for LRISP

The method that has been developed consists of six stages. These are:

* Stage 1: Understand the environment
* Stage 2: Define the objectives
* Stage 3: Identify the constraints
* Stage 4: Develop a strategy
* Stage 5: Suggest project candidates
* Stage 6: Specify expected performance

The first four stages produce a LRISP. The last two stages implement the plan by creating a set of project candidates as well as performance measures. The list of projects serves as input into the next planning level which determines a slate of projects for the next period. The approach draws from the multi-faceted model to planning described in Taylor (1976). It is a mixture of the planning approaches defined in Soden (1975), Soden and Tucker (1976), and McLean and Soden (1977). It also accepts the longer term view in Kriebel (1968), McFarlan (1971). The measurement and performance needs expressed by Jackson (1976), Kurth (1977) and Tipgos (1975) are reflected in the last two stages. The approaches reviewed of Lovange (1974) and assumed in Lusk and Wolf (1975) contributed to the formal approach in stages 1-4 and implementation considerations in the next section. We will examine now each stage in detail.

* Stage 1: Understand the environment

In traditional LRIS planning this includes mainly cost information and resource usage/personnel, computer time, terminals, etc. In this

method the scope is expanded to include organization, facilities, statistics (costs, usage), users served, and an assessment of the relationship with the users of information services.

With respect to organization we need to not only know the personnel count and organization structure, but also the way in which it relates to the users. Similar remarks hold for computer and data communications related services. For each user organization the role of information services support can be defined. At this time we include internal organization policies as well. Examples include: 1) providing equipment, 2) providing consulting support, 3) providing design, programming, and maintenance, 4) doing system development. It is expected that the level of sophistication and maturity will vary among user organizations. This level depends on the functions as well as prior history of information services contact with the user organization.

Once the profile of past and current service has been determined, each user organization can be contacted and interviewed to determine their future needs. The LRIS planning activity can be used to find projects that serve multiple users. An example might be to acquire an easy to use interactive financial analysis system for budgeting and planning. Such a system could fit a variety of needs. A second example might be a dedicated communication line to reduce costs.

It is tempting to stop here with the assessment of the user organizations.

But there are external factors that must be addressed. The most obvious is technological advance and its influence on price/performance as well as added function. Such developments are not entirely beneficial since they raise issues and potential problems if not addressed adequately. Two examples of this are:

-hardware advances - excessive options

-interactive software availability - possibly longer development cycle, more complex interfaces

It is important then to not only note trends, but also impacts.

In a similar way we must address economics, political/legal, and social trends. These include the state of the economy, the status of privacy laws, and the ability to send data across national boundaries. Again,with each identified trend we must assess its impact.

After these trends and impacts have been identified, we can construct a picture of the nature of services that can be provided as well as the characteristics of demands for such services. We can identify critical issues and problems that the LRISP must face.

Examples of critical issues could include:

-increasing services with stable resources

-increasing user involvement

-control of distributed processing

-implementation of a data management approach

* Stage 2: Define the objective

What is the purpose of information services over the long range? This question must be answered in the context of the primary missions (charter) of the systems related organizations as well as secondary obligations.

The objectives should address at least some of the following:

-meet the purpose of the information service organization

-enhance the likelihood of the organization

-relieve pressures identified in Stage 1

-prevent problems and disasters

Many such objectives that have been included in LRISP are too time dependent and narrow. Objectives should be:

-broad in scope

-directional to provide focus

-relatively timeless

Some objectives could be to increase effectiveness and to increase the role of information systems.

* Stage 3: Identify the constraints

Constraints are road blocks to achieving desired objectives. Some are more tangible than others. Constraints are factors which provide obstacles to reaching the objectives, limit resources and/or actions, or are gaps between present status or method and what is possible.

Constraints can also be self imposed policies as well as rules and regulations imposed internally or externally.

Each constraint should be considered in regard to the objectives. Those constraints that do not prevent the achievement of the objectives are termed pseudo constraints and can be rejected. With each remaining constraint the impact must be clearly defined. The impact is how the factor inhibits the attainment of the objective.

Examples of constraints are budgetary limits, operating system limitations and overhead, lack of control over users, limited information system staff knowledge of business, and lack of uniform procedures.

* Stage 4: Develop the strategy

The strategy is the best path to pursue the objectives despite the constraints. The strategy should aim at removing obstacles, budging gaps, revising policies, and setting new direction. The best path can be viewed in terms of a measurement criteria such as time, cost, convenience, and control.

Two examples of the above four stages are given in Figure 3. Although in many cases much more detail can be added, this may not be beneficial. The LRISP should avoid over-dependence on technology related areas since these can obscure problems relating to organization and to users.

FIGURE 3

Examples of elements of LRISP

Example A	Example B
Environment	
* info. systems and business systems changing rapidly	* info. services response slow
* no positive assurance that project efforts are effective	* users solicit help from outside
* systems evolve in reactive made	* maintenance consumes resources
Objective	
Improve effectiveness of info. services	Control and later expand info. services role
Constraints	
* technology limitations	* limited info. services resources
* lack of knowledge of business system	* lack of control
Strategy	
* establish sense of direction	* improve productivity
* learn more of user needs	* improve quality

* Stage 5 - Suggest project candidates

The previous stages could be viewed as theoretical. Here we put the work to an acid test. Can it generate project candidates? These will later compete with existing and backlogged projects in strategic information services planning. Several project candidates for the examples in figure 3 are:

- Example A - initiate a statement on information services architecture
- Example B
    * improve project control
    * crossbreed information system and user staffs
    * define several research areas for new opportunities
    * improve management of resources

* Stage 6 - Specify expected performance

Here the benefits of doing the projects in Stage 5 are defined. It is most important that this stage be applied to all projects. It provides a mechanism to check with the strategy as well as the objectives. Evaluating it will also make a project more competitive later during strategic information systems planning.

For our examples we have:

- Example A - improved evaluation of projects
- Example B - positive influence on users, better user relationship

Using the method

We have delineated six stages sequentially. We note that it is

interactive and iterative. Thus, we would anticipate redoing and reworking the results after the initial development.

In preparing a report on the LRISP it is important to write up the results of all six stages. Each stage evolves from the previous stages and is incomplete without an overall picture.

8. Developing a project slate - strategic information services planning

Given the methodology presented above and a set of project candidates we must actively seek to combine the LRISP and current activities to develop a project slate. An effect of a LRISP is on the allocation of resources in the annual action plan. We can identify five categories of information systems work:

* on-going - current projects
* back-log - projects accepted for work but not yet started
* LRISP items - tasks and projects generated by the LRISP
* user requests - requests by users for immediate service
* new opportunities - projects which are undertaken due to new information or external factors

The new projects in a LRISP must compete with other categories for resources. The strategic information services planning approach is two pronged - first to prioritize within each category and second to decide on the mixture of work between categories. Given stable resource levels the project candidates in each category must be prioritized. Primary and secondary criteria for each category appear in figure 4. Note that these criteria differ by category. In particular given the need for control and new functions the criteria for LRISP items is impact rather than just rate of return. Other criteria can also be applied but figure 4 has served as a useful guide.

FIGURE 4:

Criteria for Priority of Projects

Category	Primary	Secondary
on-going	necessity	size of project
back-log	rate of return	payback period
LRISP items	impact	technical feasibility
user requests	urgency	equalizations
new opportunity	impact	rate of return

FIGURE 5:

Project Mixture

Year	on-going	back-log	LRISP items	user requests	new opportunity
1 Previous year's plan	40%	55%	0%	10%	5%
2 First year with LRISP	40%	50%	5%	10%	5%
3 Second year with LRISP	40%	45%	10%	5%	10%

One difficulty an LRISP faces is the competition with projects in these other categories. The method presented earlier does not lead to a wholesale adoption of items in the LRISP. Indeed, in both cases so far it serves to reform the activities and channel them to increase the impact. A sample mix between categories is shown in figure 5. Here in this hypothetical, but representative figure we see that on-going maintenance work remains relatively fixed. More selectivity is applied to the back-log of projects and to user requests for immediate service.

The approach here describes how the projects can be combined prior to evaluation and then evaluated. It is important to note that 1) different criteria are applied to project evaluation within each category and 2) the project lists are maintained separately and not merged with a single set of evaluation criteria.

The next step is to develop detailed project plans for each member of the project slate. For this most organizations can employ existing techniques.

9. Applications

Two large organizations have worked with the methodology to date. The first is a large, multinational corporation with semiautonomous divisions. There was previously little activity on LRIS planning. Data collection then was restricted to cost information. Justification for new resources was based solely on current need. With the method presented earlier it was decided to take an incremental approach. In the first phase data was collected in the areas of

* personnel resources
* computer resources

* data communication
* categories of services provided
* users served
* objectives
* issues

Data was collected by questionnaire with presentations of the method to various groups including data processing, information systems, data administration, and user groups. Each division then consolidated its data. The planning staff acted in a coordinating role. Individual division plans were presented tc management by the respective division. In parallel to this effort the planning group prepared a detailed plan for one division.

The reaction to the method was generally favorable. At the corporation wide level there has been an increase in communications between divisions. Several joint projects have been initiated. There has also been a more unified approach to problems in information services. At the division level in the division where the plan was carved several new projects were initiated which could be identified with the projects identified in the LRISP. In addition several projects were cancelled due to low priority and incompatability with long range goals.

The second organization is a non-profit organization with a centralized information services group. The group had been trained by a leading hardware manufacturer in systems planning. This had resulted in improved action planning, but had not provided the forms and direction for long range information services planning. The methods used in the systems planning course were reviewed and found to be compatible with the method presented here. The method was applied and a LRISP

developed. The plan was implemented successfully and was endorsed strongly by user organizations who expressed approval in that more direction was provided and that they could see the trade-offs between their projects and those of other user organizations.

In both cases major tasks were to limit data collection for the planning activity. Enough data needs to be collected to identify a list of candidate projects and to develop a strategy. This applies to both division and organization-wide planning. In addition at the division level the data must also support the strategic information services planning to obtain a project slate.

10. Conclusion and Remarks

A method for long range information systems planning has been presented along with a discussion of two applications of the method. The method differs from previous approaches in that it addresses a wider scope of activities to reflect the spread of technology and it focuses on an active connection with action planning.

We have also defined an interactive level of planning strategic information services planning. This level delineates the projects to be worked on during the next period. As such it provides a linkage between the LRISP and action plan. It also provides the LRIS planning activity with the luxury of restricting focus to developing a strategy and project candidates.

Further areas of research include the measurement of the service provided by information services as well as the specification of performance measures.

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